COSMETIC COMPOSITIONS CONTAINING SALTS OF MALONIC ACID

BACKGROUND OF THE INVENTION

Field of the Invention

[0001] The invention concerns cosmetic compositions containing salts of malonic acid and use of these compositions to control the signs of skin aging.

The Related Art

[0002] A soft, supple and flexible skin has a marked cosmetic appeal and is an attribute of normal functioning epidermis. As human skin ages with advancing years, the epidermis can become folded, ridged or furrowed to form wrinkles. These signal loss of youthful appearance and herald the transition to old age. Exposure to excessive doses of sunlight accelerates the transition process. Also, the outer layer of the epidermis known as the stratum corneum can become dry and flaky following exposure to cold weather or excessive contact with detergents or solvents. Loss of skin moisture thereby results and the skin begins to lose the soft, supple and flexible characteristics.

[0003] Emollients such as fats, phospholipids and sterols have in the past been used to soften wrinkled or dry skin. These emollients are only partially effective as a remedy for skin in poor condition.

[0004] The use of hydroxy carboxylic acids for enhancing the quality of human skin has been known for some time. There is no doubt that alpha-hydroxy carboxylic acids are effective much beyond the common emollients.

[0005] U.S. Patent 4,424,234 (Alderson et al.) discloses skin treatment compositions incorporating alpha-hydroxycaproic acid and alpha-hydroxycaprylic acid or mixtures thereof in compositions that have a pH value of less than 7, usually from 2 to 4. Yu and Van Scott have patented widely in this area. For instance, U.S. Patent 4,105,782 reports amines or ammonium salts of alpha-hydroxy carboxylic acids in the treatment of acne or dandruff. In U.S. Patent 4,105,783 and U.S. Patent 4,197,316, these compounds are suggested for the treatment of dry skin. U.S. Patent 4,234,599 discloses the use of alpha-hydroxy carboxylic acids, their esters or amine salts in the treatment of keratoses. More recently, U.S. Patent 5,091,171 focused attention on these compounds as being effective against age spots, wrinkles and aging related skin changes.

[0006] While hydroxy carboxylic acids hold much therapeutic promise, the materials have been found to irritate human skin on repeated topical applications. The irritation may range from a sensation of tingling, itching and burning to clinical signs of redness and peeling. Causes for such irritation have been linked to the lowering of pH in the stratum

corneum of human skin. Low pH has been suggested as provoking disturbances in intercorneocyte bondings resulting in adverse skin reactions, especially in some individuals with sensitive skin.

[0007] Organic acids other than alpha-hydroxy functionalized have been disclosed in the cosmetic literature. For instance, U.S. Patent 5,641,495 (Jokura et al.) discloses in combination a ceramide or pseudoceramide, a dicarboxylic acid and a salt of a dicarboxylic acid. The Examples illustrate sodium and potassium salts of succinic acid. Lower molecular weight dicarboxylic acids such as malonic may also be utilized. Although excellent moisturization and little accompanying irritation occurs, there is no suggestion that this system combats signs of aging leading to loss of softness, suppleness, and flexibility of skin. Improvements in these areas remain as an unfulfilled need of the consumer.

[0008] Accordingly, it is an advantage of the present invention to provide new cosmetic ingredients in compositions which are effective at controlling and even eliminating the signs of aging, particularly with respect to improving skin softness, suppleness and flexibility.

SUMMARY OF THE INVENTION

[0009] A cosmetic composition is provided which includes:

(i) from about 0.0001 to about 30% by weight of a salt of malonic acid;

(ii) from about 1 to about 99.9% by weight of a cosmetically acceptable carrier;

wherein the composition exhibits a Flexibility Value greater than 1 in the Porcine Skin Test.

[00010] Furthermore, there is provided a method for controlling signs of aging which includes:

providing a cosmetic composition including:

(i) from about 0.0001 to about 30% by weight of a salt of malonic acid;

(ii) from about 1 to about 99.9% by weight of a cosmetically acceptable carrier;

wherein the composition exhibits a Flexibility Value greater than 1 in the Porcine Skin Test; and

applying the cosmetic composition to the skin.

DETAILED DESCRIPTION OF THE INVENTION

[00011] We have now found that salts of malonic acid are at least as effective as alpha-hydroxy carboxylic acids in combating the signs of skin aging. Most particularly, salts of malonic acid have shown significant activity in improving the softness, suppleness and flexibility of skin.

[00012] A feature of the present invention is that malonate salts are those which impart to the composition a positive Flexibility Value of at least 1, preferably at least 1.1 relative to water in the Porcine Skin Test. This test utilizes a thermo-mechanical analyzer with a 20 gram load to a one-cm diameter disc of Porcine Skin from which the immediate deflection is recorded in mm. Water serves as a control. Skin samples are measured before and 24 hours after one, two and three treatments. These treatments consist of 150 µl of each composition being applied to the skin for five minutes, then removed without rinsing. Thereafter, drying is performed at 21°C and less than 10% relative humidity. Data transformation consists of determining the ratio of the deflection value after three applications of the test composition to the deflection value of the water standard. The ratio is defined as the Flexibility Value.

[00013] A wide variety of counter cations to the malonate anions may be utilized in forming the salt. Malonate salts may either be the half or fully neutralized malonic acid or combinations thereof as represented by general formulas (I) and (II):

$[HO_2CCH_2CO_2]^-[X]^+$ $^+[X]_2[O_2CCH_2CO_2]^{-2}$

I II

wherein X is a cationic counterion.

[00014] Suitable cationic counterions include those of alkali and alkaline earth metals. Representative examples include the cations of lithium, sodium, potassium, magnesium, calcium, ammonium and combinations thereof.

[00015] Not only inorganic but also organic cations can be employed. Particularly useful are quaternized nitrogen cations having from 1 to 1,000, preferably from 1 to 20, and optimally from 3 to 12 carbon atoms. Illustrative are those cations derived from amines which include triethanolamine, diethanolamine, propanolamine, monoethanolamine, methylamine, ethylamine, propylamine, isopropylamine, butylamine, isobutylamine, t-butylamine, pentylamine, isopentylamine, hexylamine, cyclohexylamine, cyclopentylamine, norbornylamine, octylamine, ethylhexylamine, nonylamine, decylamine, pyrrolidone, amino acids (lysine, arginine, alanine, glutamine, histidine, glycine), 2-amino-2-methyl-1-propanol, dimethylethanolamine, polyethyleneimine, tris(hydroxymethyl)amino methane and combinations thereof. Most preferred are the cations derived from ammonia, dimethylethanolamine and tris(hydroxymethyl)amino methane. Typical malonate salts derived from these preferred materials include ammonium malonate, diammonium malonate, dimethylethanolammonium malonate, bis(dimethylethanolammonium)malonate, tris(hydroxymethyl)methane

ammonium malonate, and di[tris(hydroxymethyl)methane ammonium]malonate.

[00016] Amounts of the malonic acid salt may range from about 0.0001 to about 30%, preferably from about 0.1 to about 15%, more preferably from about 0.5 to about 10%, optimally from about 1 to about 8% by weight of the cosmetic composition.

[00017] The present invention can utilize as the active ingredient salt I, salt II or mixtures of these salts. When mixtures are present the molar ratio of mono-salt I to di-salt II may range from about 1000:1 to about 1:1000, preferably from about 10:1 to about 1:500, more preferably from about 2:1 to about 1:200, optimally from about 1:1 to about 1:20.

[00018] Compositions of this invention will also include a cosmetically acceptable carrier. Amounts of the carrier may range from 1 to 99.9%, preferably from about 70 to about 95%, optimally from about 80 to about 90%. Among the useful carriers are water, emollients, fatty acids, fatty alcohols, humectants, thickeners and combinations thereof. The carrier may be aqueous, anhydrous or an emulsion. Preferably the compositions are aqueous, especially water and oil emulsions of the W/O or O/W or triplex W/O/W variety. Water when present may be in amounts ranging from about 5 to about 95%, preferably from about 20 to about 70%, optimally from about 35 to about 60% by weight.

[00019] Emollient materials may serve as cosmetically acceptable carriers. These may be in the form of silicone oils, synthetic esters and hydrocarbons. Amounts of the emollients may range anywhere from about 0.1 to about 95%, preferably between about 1 and about 50% by weight.

[00020] Silicone oils may be divided into the volatile and nonvolatile variety. The term "volatile" as used herein refers to those materials which have a measurable vapor pressure at ambient temperature. Volatile silicone oils are preferably chosen from cyclic (cyclomethicone) or linear polydimethylsiloxanes containing from 3 to 9, preferably from 4 to 5, silicon atoms.

[00021] Nonvolatile silicone oils useful as an emollient material include polyalkyl siloxanes, polyalkylaryl siloxanes and polyether siloxane copolymers. The essentially nonvolatile polyalkyl siloxanes useful herein include, for example, polydimethyl siloxanes with viscosities of from about 5×10^{-6} to 0.1 m^2/s at 25 C. Among the preferred nonvolatile emollients useful in the present compositions are the polydimethyl siloxanes having viscosities from about 1×10^{-5} to about 4×10^{-4} m^2/s at 25 C.

[00022] Another class of nonvolatile silicones are emulsifying and non-emulsifying silicone elastomers. Representative of this category is Dimethicone/Vinyl Dimethicone Crosspolymer available as Dow Corning 9040, General Electric SFE 839, and Shin-Etsu KSG-18. Silicone waxes such as Silwax WS-L (Dimethicone Copolyol Laurate) may also be useful.

[00023] Among the ester emollients are:

(1) Alkenyl or alkyl esters of fatty acids having 10 to 20 carbon atoms. Examples thereof include isoarachidyl neopentanoate, isononyl isonanonoate, oleyl myristate, oleyl stearate, and oleyl oleate.

(2) Ether-esters such as fatty acid esters of ethoxylated fatty alcohols.

(3) Polyhydric alcohol esters. Ethylene glycol mono and di-fatty acid esters, diethylene glycol mono- and di-fatty acid esters, polyethylene glycol (200-6000) mono- and di-fatty acid esters, propylene glycol mono- and di-fatty acid esters, polypropylene glycol 2000 monooleate, polypropylene glycol 2000 monostearate, ethoxylated propylene glycol monostearate, glyceryl mono- and di-fatty acid esters, polyglycerol poly-fatty esters, ethoxylated glyceryl mono-stearate, 1,3-butylene glycol monostearate, 1,3-butylene glycol distearate, polyoxyethylene polyol fatty acid ester, sorbitan fatty acid esters, and polyoxyethylene sorbitan fatty acid esters are satisfactory polyhydric alcohol esters. Particularly useful are pentaerythritol, trimethylolpropane and neopentyl glycol esters of C_1-C_{30} alcohols.

(4) Wax esters such as beeswax, spermaceti wax and tribehenin wax.

(5) Sterols esters, of which cholesterol fatty acid esters are examples thereof.

(6) Sugar ester of fatty acids such as sucrose polybehenate and sucrose polycottonseedate.

[00024] Hydrocarbons which are suitable cosmetically acceptable carriers include petrolatum, mineral oil, C_{11}-C_{13} isoparaffins, polyalphaolefins, and especially isohexadecane, available commercially as Permethyl 101A from Presperse Inc.

[00025] Fatty acids having from 10 to 30 carbon atoms may also be suitable as cosmetically acceptable carriers. Illustrative of this category are pelargonic, lauric, myristic, palmitic, stearic, isostearic, hydroxystearic, oleic, linoleic, ricinoleic, arachidic, behenic and erucic acids.

[00026] Fatty alcohols having from 10 to 30 carbon atoms are another useful category of cosmetically acceptable carrier. Illustrative of this category are stearyl alcohol, lauryl alcohol, myristyl alcohol and cetyl alcohol.

[00027] Humectants of the polyhydric alcohol-type can be employed as cosmetically acceptable carriers. Typical polyhydric alcohols include glycerol, polyalkylene glycols and more preferably alkylene polyols and their derivatives, including propylene glycol, dipropylene glycol, polypropylene glycol, polyethylene glycol and derivatives thereof, sorbitol, hydroxypropyl sorbitol, hexylene glycol, 1,3-butylene glycol, isoprene glycol, 1,2,6-hexanetriol, ethoxylated glycerol, propoxylated glycerol and mixtures thereof. The amount of humectant may range anywhere from 0.5 to 50%, preferably between 1 and 15% by weight of the composition.

[00028] Thickeners can be utilized as part of the cosmetically acceptable carrier of compositions according to the present invention. Typical thickeners include crosslinked acrylates (e.g. Carbopol 982®), hydrophobically-modified acrylates (e.g. Carbopol 1382®), cellulosic derivatives and natural gums. Among useful cellulosic derivatives are sodium carboxymethylcellulose, hydroxypropyl methocellulose, hydroxypropyl cellulose, hydroxyethyl cellulose, ethyl cellulose and hydroxymethyl cellulose. Natural gums suitable for the present invention include guar, xanthan, sclerotium, carrageenan, pectin and combinations of these gums. Inorganics may also be utilized as thickeners, particularly clays such as bentonites and hectorites, fumed silicas, and silicates such as magnesium aluminum silicate (Veegum®). Amounts of the thickener may range from 0.0001 to 10%, usually from 0.001 to 1%, optimally from 0.01 to 0.5% by weight.

[00029] Cosmetic compositions of the present invention may be in any form. These forms may include lotions, creams, roll-on formulations, sticks, mousses, aerosol and non-aerosol sprays and fabric (e.g. nonwoven textile)-applied formulations.

[00030] Surfactants may also be present in cosmetic compositions of the present invention. Total concentration of the surfactant when present may range from about 0.1 to about 40%, preferably from about 1 to about 20%, optimally from about 1 to about 5% by weight of the composition. The surfactant may be selected from the group consisting of anionic, nonionic, cationic and amphoteric actives. Particularly preferred nonionic surfactants are those with a C_{10}-C_{20} fatty alcohol or acid

hydrophobe condensed with from 2 to 100 moles of ethylene oxide or propylene oxide per mole of hydrophobe; C_2-C_{10} alkyl phenols condensed with from 2 to 20 moles of alkylene oxide; mono- and di-fatty acid esters of ethylene glycol; fatty acid monoglyceride; sorbitan, mono- and di- C_8-C_{20} fatty acids; and polyoxyethylene sorbitan as well as combinations thereof. Alkyl polyglycosides and saccharide fatty amides (e.g. methyl gluconamides) are also suitable nonionic surfactants.

[00031] Preferred anionic surfactants include soap, alkyl ether sulfates and sulfonates, alkyl sulfates and sulfonates, alkylbenzene sulfonates, alkyl and dialkyl sulfosuccinates, C_8-C_{20} acyl isethionate, C_8-C_{20} alkyl ether phosphates, C_8-C_{20} sarcosinates and combinations thereof.

[00032] Sunscreen actives may also be included in compositions of the present invention. Particularly preferred are such materials as ethylhexyl p-methoxycinnamate, available as Parsol MCX®, Avobenzene, available as Parsol 1789® and benzophenone-3, also known as Oxybenzone. Inorganic sunscreen actives may be employed such as microfine titanium dioxide, zinc oxide, polyethylene and various other polymers. Amounts of the sunscreen agents when present may generally range from 0.1 to 30%, preferably from 2 to 20%, optimally from 4 to 10% by weight.

[00033] Preservatives can desirably be incorporated into the cosmetic compositions of this invention to protect against the growth of potentially harmful microorganisms. Suitable traditional preservatives for compositions of this invention are alkyl esters of para-hydroxybenzoic acid. Other preservatives which have more recently come into use

include hydantoin derivatives, propionate salts, and a variety of quaternary ammonium compounds. Cosmetic chemists are familiar with appropriate preservatives and routinely choose them to satisfy the preservative challenge test and to provide product stability. Particularly preferred preservatives are phenoxyethanol, methyl paraben, propyl paraben, imidazolidinyl urea, sodium dehydroacetate and benzyl alcohol. The preservatives should be selected having regard for the use of the composition and possible incompatibilities between the preservatives and other ingredients in the emulsion. Preservatives are preferably employed in amounts ranging from 0.01% to 2% by weight of the composition.

[00034] Compositions of the present invention may include vitamins. Illustrative vitamins are Vitamin A (retinol), Vitamin B_2, Vitamin B_6, Vitamin C, Vitamin E and Biotin. Derivatives of the vitamins may also be employed. For instance, Vitamin C derivatives include ascorbyl tetraisopalmitate, magnesium ascorbyl phosphate and ascorbyl glycoside. Derivatives of Vitamin E include tocopheryl acetate, tocopheryl palmitate and tocopheryl linoleate. DL-panthenol and derivatives may also be employed. Total amount of vitamins when present in compositions according to the present invention may range from 0.001 to 10%, preferably from 0.01% to 1%, optimally from 0.1 to 0.5% by weight.

[00035] Another type of useful substance can be that of an enzyme such as oxidases, proteases, lipases and combinations. Particularly preferred is superoxide dismutase, commercially available as Biocell SOD from the Brooks Company, USA.

[00036] Skin lightening compounds may be included in the compositions of the invention. Illustrative substances are placental extract, lactic acid, niacinamide, arbutin, kojic acid, ferulic acid, resorcinol and derivatives including 4-substituted resorcinols and combinations thereof. Amounts of these agents may range from about 0.1 to about 10%, preferably from about 0.5 to about 2% by weight of the compositions.

[00037] Desquamation promoters may be present. Illustrative are the alpha-hydroxycarboxylic acids and beta-hydroxycarboxylic acids. The term "acid" is meant to include not only the free acid but also salts and C_1-C_{30} alkyl or aryl esters thereof and lactones generated from removal of water to form cyclic or linear lactone structures. Representative acids are glycolic, lactic and malic acids. Salicylic acid is representative of the beta-hydroxycarboxylic acids. Amounts of these materials when present may range from about 0.01 to about 15% by weight of the composition.

[00038] A variety of herbal extracts may optionally be included in compositions of this invention. Illustrative are green tea, chamomile, licorice and extract combinations thereof. The extracts may either be water soluble or water-insoluble carried in a solvent which respectively is hydrophilic or hydrophobic. Water and ethanol are the preferred extract solvents.

[00039] Also included may be such materials as lipoic acid, retinoxytrimethylsilane (available from Clariant Corp. under the Silcare 1M-75 trademark), dehydroepiandrosterone (DHEA) and combinations thereof. Ceramides (including Ceramide 1, Ceramide 3, Ceramide 3B and Ceramide 6) as well as pseudoceramides may also be utilized for

many compositions of the present invention may also be excluded. Amounts of these materials may range from about 0.000001 to about 10%, preferably from about 0.0001 to about 1% by weight.

[00040] Colorants, fragrances, opacifiers and abrasives may also be included in compositions of the present invention. Each of these substances may range from about 0.05 to about 5%, preferably between 0.1 and 3% by weight.

[00041] The term "comprising" is meant not to be limiting to any subsequently stated elements but rather to encompass non-specified elements of major or minor functional importance. In other words the listed steps, elements or options need not be exhaustive. Whenever the words "including" or "having" are used, these terms are meant to be equivalent to "comprising" as defined above.

[00042] Except in the operating and comparative examples, or where otherwise explicitly indicated, all numbers in this description indicating amounts of material ought to be understood as modified by the word "about".

[00043] The following examples will more fully illustrate the embodiments of this invention. All parts, percentages and proportions referred to herein and in the appended claims are by weight unless otherwise illustrated.

EXAMPLE 1

[00044] A typical cosmetic cream according to the present invention is outlined under Table I.

TABLE I

INGREDIENT	WEIGHT %
PHASE A	
Water	Balance
Disodium EDTA	0.05
Methyl Paraben	0.15
Magnesium Aluminum Silicate	0.60
Triethanolamine	1.20
PHASE B	
Xanthan Gum	0.20
Natrosol® 250HHR (ethyl cellulose)	0.50
Butylene Glycol	3.00
Glycerin	2.00
PHASE C	
Sodium Stearoyl Lactylate	0.10
Glycerol Monostearate	1.50
Stearyl Alcohol	1.50
Isostearyl Palmitate	3.00
Silicone Fluid	1.00
Cholesterol	0.25
Sorbitan Stearate	1.00
Butylated Hydroxy Toluene	0.05
Vitamin E Acetate	0.01
PEG-100 Stearate	2.00
Stearic Acid	3.00
Propyl Paraben	0.10
Parsol MCX®	2.00
Caprylic/Capric Triglyceride	0.50
Hydroxycaprylic Acid	0.01
C12-15 Alkyl Octanoate	3.00
PHASE D	
Malonate Salt	3.00
PHASE E	
Vitamin A Palmitate	0.10
Bisabolol	0.01
Vitamin A Acetate	0.01
Fragrance	0.03
Retinol 50C	0.02

EXAMPLE 2

[00045] A water-in-oil topical liquid make-up foundation utilizing the malonate salts of the present invention is described in Table II below.

TABLE II

INGREDIENT	WEIGHT %
PHASE A	
Cyclomethicone	9.25
Cetyl Octanoate	2.00
Dimethicone Copolyol	20.00
PHASE B	
Talc	3.38
Pigment (Iron Oxides)	10.51
Spheron L-1500 (Silica)	0.50
PHASE C	
Synthetic Wax Durachem 0602	0.10
Arachidyl Behenate	0.30
PHASE D	
Cyclomethicone	1.00
Trihydroxystearin	0.30
PHASE E	
Laureth-7	0.50
Propyl Paraben	0.25
PHASE F	
Fragrance	0.05
PHASE G	
Water	balance
Ammonium Malonate	3.00
Methyl Paraben	0.12
Propylene Glycol	8.00
Niacinamide	4.00
Glycerin	3.00
Sodium Chloride	2.00
Sodium Dehydroacetate	0.30

EXAMPLE 3

[00046] Illustrated herein is a skin cream incorporating the malonate salts of the present invention.

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TABLE III

INGREDIENT	WEIGHT %
Glycerin	6.93
Niacinamide	5.00
Dimethylethanolammonium Malonate	5.00
Permethyl 101A[1]	3.00
Sepigel 305[2]	2.50
Q2-1403[3]	2.00
Isopropyl Isostearate	1.33
Arlatone 2121[4]	1.00
Cetyl Alcohol CO-1695	0.72
SEFA Cottonate[5]	0.67
Tocopherol Acetate	0.50
Panthenol	0.50
Stearyl Alcohol	0.48
Titanium Dioxide	0.40
Disodium EDTA	0.10
Glydant Plus[6]	0.10
PEG-100 Stearate	0.10
Stearic Acid	0.10
Purified Water	Balance

[1] Isohexadecane, Presperse Inc., South Plainfield, NJ
[2] Polyacrylamide(and)C13-14 Isoparaffin(and) Laureth-7, Seppic Corporation, Fairfield, NJ
10 [3] dimethicone(and)dimethiconol, Dow Corning Corp. Midland, MI
[4] Sorbitan Monostearate and Sucrococoate, ICI Americas Inc., Wilmington, DE
[5] Sucrose ester of fatty acid
[6] DMDM Hydantoin (and) Iodopropynyl Butylcarbamate, Lonza Inc., Fairlawn, NJ

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EXAMPLE 4

[00047] Illustrative of a powdered cosmetic composition according to the present invention is the formula of Table IV.

TABLE IV

INGREDIENT	WEIGHT %
Polysilicone-11	27.5
Cyclomethicone	54
Petrolatum	11
Tris(hydroxymethyl)methaneammonium Malonate	7
Dimethicone Copolyol	0.5

EXAMPLE 5

[00048] A relatively anhydrous composition according to the present invention is reported in Table V.

TABLE V

INGREDIENT	WEIGHT %
Cyclomethicone	80.65
Dimethicone	9.60
Squalane	6.00
Isostearic Acid	1.90
Borage Seed Oil	0.90
Lithium Malonate (50% in water)	0.50
Retinyl Palmitate	0.25
Ceramide 6	0.10
Tocopherol	0.10

EXAMPLE 6

[00049] An aerosol packaged foaming cleanser suitable for the present invention is outlined in Table VI.

TABLE VI

INGREDIENT	WEIGHT %
Sunflower Seed Oil	20.00
Maleated Soybean Oil	5.00
Silicone Urethane	1.00
Polyglycero-4 Oleate	1.00
Sodium C14-16 Olefin Sulfonate	15.00
Sodium Lauryl Ether Sulphate (25% active)	15.00
Cocoamidopropylbetaine	15.00
DC 1784® (Silicone Emulsion 50%)	5.00
Polyquaternium-11	1.00
Bis(dimethylethanolammonium) Malonate	1.00
Water	Balance

[00050] An aerosol is prepared using 92% by weight of the concentrate in Table VI and 8% propellant, the latter being a combination of dimethylether, isobutane and propane.

EXAMPLE 7

[00051] An adhesive cosmetic patch may also be formulated according to the present invention. An adhesive hydrogel is prepared by mixing 30 grams of 2-acrylamido-2-methylpropane sulphonic acid monomer in 20 grams distilled water and 5 grams of a 1% aqueous solution of methylene-bis-acrylamide. The solution is then activated with 0.4% magnesium

persulphate catalyst. Shortly after mixing the catalyst with the hydrogel solution, 0.1 grams ammonium malonate in 5 ml water is added. The resultant solution is coated onto a 50/50 blend of polypropylene and hydrophilic polyester and allowed to solidify. The resulting deposited hydrogel is warmed for 24 hours at 40 C in a hot air oven. Final water content of the hydrogel is 50%. A polystyrene backing layer is laid over the adhesive hydrogel.

EXAMPLE 8

[00052] A disposable, single use personal towelette product is described according to the present invention. A 70/30 polyester/rayon non-woven towelette is prepared with a weight of 1.8 grams and dimensions of 15 cm by 20 cm. Onto this towelette is impregnated a composition as outlined in Table VII below.

TABLE VII

INGREDIENT	WEIGHT %
Magnesium Malonate	7.50
Glycerin	2.00
Hexylene Glycol	2.00
Disodium Capryl Amphodiacetate	1.00
Gluconolactone	0.90
Silicone Microemulsion	0.85
Witch Hazel	0.50
PEG-40 Hydrogenated Castor Oil	0.50
Fragrance	0.20
Vitamin E Acetate	0.001
Water	Balance

EXAMPLE 9

[00053] A variety of carboxylic acid salts were evaluated to determine their response in a Porcine Skin Test. A Perkin-Elmer Thermo-Mechanical Analyzer, Model TMS-1, was operated with a 20 gram load placed to a center of a one-cm diameter disc of Porcine Skin. Deflection of the skin in mm was immediately recorded. The sample size was six pieces of skin per treatment. Water was used as a control. Each piece served as an internal control. Each was measured dry before and 24 hours after one, two and three treatments. Each treatment consisted of 150 μl of a test material solution applied to skin for 5 minutes, then removed without rinsing. Drying conditions were 21 C and less then 10% humidity. Results are recorded in Table VIII.

TABLE VIII

Material Evaluated	Flexibility Value
Water (reference standard)	1.00
Succinate Salt*	0.85
Glycolate Salt*	0.85
Malonate Salt**	1.36

* ammonium salt
** dimethylethanolammonium salt

[00054] Evident from the results is that the malonate salt rendered the skin significantly more flexible. By contrast, the succinate and glycolate salts rendered the skin significantly stiffer. The effects of glycolate and succinate were statistically similar. These results indicate that malonate salts and compositions containing these salts can improve the softness, suppleness and flexibility.

[00055] Table IX records Flexibility Values as measured on the cosmetic cream formulation detailed under Table I (utilizing different Phase D actives). Flexibility Value for the malonate salt formulated cream was higher than either the base cream or a glycolate salt formulated cream. The results demonstrate that a softer, suppler and more flexible skin is achieved by use of malonates.

TABLE IX

Material Evaluated*	Fllexibility Value
Water (reference standard)	1.00
Base Cream (No Salt)	0.89
Base Cream (Glycolate Salt)	0.84
Base Cream (Malonate Salt)	1.12

* Salt in parenthesis refers to Phase D active of Example 1 (Table I)

[00056] The foregoing description and examples illustrate selected embodiments of the present invention. In light thereof variations and modifications will be suggested to one skilled in the art, all of which are within the spirit and purview of this invention.